ESTHETIC ADJUSTMENT OF ALVEOLAR RIDGE DEFECT USING THE ROLL FLAP TECHNIQUE

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ABSTRACT

Repair of lost oral structures and prevention of unaesthetic deformities are the goals of current periodontal plastic procedures. The restorative dentist is often forced to compromise with the design of the fixed prosthesis if surgically uncorrected localized alveolar defect is present in the edentulous area. Such defects can be overcome not only by a variety of prosthetic means, but also by several periodontal surgical techniques, notably soft tissue augmentation. These techniques can effectively improve the ridge contour and thereby the mucogingival esthetic and the pontic ridge relationship. One of the simplest and the most predictable procedure is the Roll flap technique (Deepithelised connective tissue pedicle flap technique) as described by Dr. Leonard Abrams. This case report presents the successful use of Roll flap technique for the esthetic reconstruction of alveolar ridge defect that had proved as the most effective preprosthetic surgical procedure for esthetic repair of alveolar ridge defect.

Keywords: Pedicle flap, ridge augmentation, black interdental triangles

INTRODUCTION

Alveolar ridge augmentation, an interdisciplinary approach, encompasses several theoretically difficult restorative problems for patient and clinicians. Recognition of esthetic mucogingival problems and to correct them are the pre-requisites for the esthetic success in prosthetic rehabilitation.

Studer et al. have defined localized alveolar ridge defect as “A volumetric deficit of limited extent in bone and soft tissue within the alveolar process”. These defects differ from generalized residual ridge atrophy and larger defects in which the body of the jaw is affected.

Critical esthetic problems arise when an anterior fixed prosthesis is fabricated over a deformed, collapsed edentulous ridge. When ridge deformation occurs; a standard pontic size and shape will not maintain a normal tooth to gingiva relationship with a resultant unattractive restoration. Periodontal disease, developmental defects, root fractures, abscess formation, surgical trauma or traumatic injury are some of the most common causes of ridge defects. Following anterior tooth extraction without some type of ridge preservation, alveolar ridge resorption occurs at a rate of 40% to 60% during the first 2 to 3 years. The resultant ridge defect commonly presents a difficult prosthetic challenge.

The classification of ridge defects was given by Seibert in 1983, which was modified by Allen in 1985 based on quantification of the amount of tissue loss. Seibert again described the ridge defects based on assessing the depth of the defect.

When ridge deformities are present, the problems encountered are; lack of emergence profile, lack of root eminence, lack of marginal gingiva and interdental papillae giving rise to “black triangles” and thus compromising the dentofacial esthetics.

Studer et al. proposed the use of pedicle graft procedure for the correction of a single tooth ridge defect. Dr. Leonard Abrams described the “Roll Flap Technique” (Deepithelized connective tissue pedicle flap technique) for correction of localized alveolar ridge defect. This case report presents the successful use of roll flap technique for esthetic correction of alveolar ridge defect.

CASE REPORT

An eighteen year old Hindu male reported to Dept. of Periodontics and Oral Implantology, Ahmedabad Dental College and Hospital, with the chief complaint of having esthetic problem in relation with
upper front tooth. Patient had a road-side accident before 1 year, due to which, his maxillary left central incisor got fractured and hence was extracted by a private dentist, and it resulted in unesthetic fixed prosthesis with visible “black interdental triangles”. He desired replacement of tooth with a fixed prosthesis. Initially a temporary fixed prosthesis was given to check for a buccolingual and apicocoronal loss of soft tissue (Figure 1, Figure 2). The prosthesis showed “black interdental triangles” between the pontic and the crest of the ridge. To correct this problem, augmentation of alveolar ridge defect was planned using the Roll Flap technique.

The patient was having type II ridge deformity in relation with the maxillary left central incisor (Figure 1). Patient had no systemic complaints and presurgical laboratory investigations were normal. Acrylic surgical stent was prepared for the purpose of retaining the post-surgical periodontal dressing.

**Technique**

After giving local anesthesia at the surgical site, the apicocoronal and buccolingual measurements were taken using the stent and a periodontal probe (Figure 2). The outline of the pedicle graft was marked on the palate using No. 15 B.P. blade by provoking site bleeding. A trapezoid shaped area was marked on the palate and extended on to the labial aspect. (Figure 3, Figure 4) and the mucosal surface within this trapezoid area was deepithelised using No. 15 B.P. blade up to a depth of 1 mm keeping the blade parallel to the surface. The pedicle flap was elevated by sharp dissection and the plane of dissection was kept close to the periosteum (Figure 5). When the plane of dissection reached the labial aspect, a supraperiosteal pouch was prepared on the buccal surface of the ridge taking care not to perforate the pouch at the apical border. The suture thread was passed through the flap for the ease of handling and reflection. The deepithelised connective tissue flap was rolled and placed in this pouch (Figure 6). This flap was held in place in pouch with direct loop sutures using 4-0 Mersilk (Figure 7). The provisional prosthesis was then placed into position and the pontic ridge relationship was examined. A light contact was established by reducing the height of pontic, to allow proper adaptation of the graft to the contours of the pontic. The fixed prosthesis was temporarily cemented. Periodontal dressing was placed on the donor site. The prejudgment acrylic surgical stent was given to prevent the dislodgement of the periodontal dressing (Figure 8). The patient was given oral hygiene instructions. Systemic antibiotics and analgesics were prescribed for 5 days. The patient was also prescribed 0.2% Chlorhexidine gluconate mouth rinse. The patient was re-examined after 10 days (Figure 9, Figure 10). The stent and periodontal dressing were removed. Then, the surgical area was irrigated with saline and the sutures were removed. The surgical site was examined for the presence of pressure points from the pontic. No pressure point was found in the pontic ridge contact area. The fixed prosthesis was then cemented into place. The patient was instructed to wear the stent for one more week. The healing was uneventful with no post-surgical complications. The patient was subsequently called after 1 month for re-evaluation. At 1 month, there was a substantial improvement in the labial contour of alveolar ridge. Definitive impressions were taken after 1½ months and final prosthesis was prepared and cemented (Figure 11, Figure 12).

**DISCUSSION**

Prosthetic treatment of localized alveolar ridge defect with a fixed prosthesis is associated with esthetic problems i.e. unesthetic “black interdental triangles”, long or thick pontic; functional problems i.e. moist speaking voice, food impaction in the black triangles, increased soft tissue muscle activity due to lack of adaptation between ridge and pontic and technical problems i.e. difficult to design an esthetic pontic. The simplest and the most predictable surgical method to correct the alveolar ridge defect is the Roll flap technique by Dr. Leonard Abrams. The greatest advantage of this technique is that, it utilizes pedicle flap. Since the pedicle is not detached from its source of nutrition it does not depend upon the “plasmatic circulation” prior to revascularization and thus has greater chances of survival and lesser chances of tissue loss and shrinkage. The other advantages of this technique are easy to perform, simple to handle and stabilize the graft, maintenance of original colour and texture, single surgical wound, and higher chances of survival of the graft. However there are certain disadvantages like dependency on the thickness of the adjacent palatal tissue, moderate volume gain and no opportunity to correct additional mucogingival problems simultaneously.

Roll flap is designed on the basis of apico-coronal and bucco-lingual augmentation required. Prior to raising the flap the mucosal surface was deepethelised. Deepethelization is important to facilitate plasma diffusion and revascularization. When the pedicle was being raised the plane of dissection was kept as close to the periosteum as possible in order to obtain
Figure 1: Temporary fixed prosthesis showing alveolar ridge defect buccolingually and apicocoronally

Figure 2: Measuring the defect with UNC-15 probe

Figure 3: Palatal view showing Trapezoidal outline of flap

Figure 4: Labial extension of the incision

Figure 5: Partial elevation of the flap

Figure 6: Flap was rolled beneath the supraperiosteal pouch
Figure 7: Sutures taken on labial side

Figure 8: Retainer was placed to retain pack

Figure 9: Follow-up after 10 days (labial view)

Figure 10: Follow-up after 10 days (palatal view)

Figure 11: Defect fill after 1 month with fixed prosthesis in place (labial view)

Figure 12: Defect fill after 1 month with fixed prosthesis in place (palatal view)
maximum amount of supraperiosteal connective tissue and to dissect away the large supraperiosteal vessels without damaging them; as they play an important role in healing. The ovate type of pontic as designed by Dr. L. Abrams was selected for the fixed prosthesis as it automatically creates interdental papilla that fills the embrasure and eliminates the unesthetic “black interdental triangles”.

Although 100% defect fill was not obtained and some residual defect remained, there was a remarkable improvement in the ridge contour, the mucogingival esthetic and pontic-ridge relationship.

CONCLUSION

Correction of localized alveolar ridge defect through the roll flap technique is a simple and predictable method for fixed prosthesis. There was a remarkable improvement in augmented ridge contour, mucogingival esthetics and pontic-ridge relationship after follow-up period of one month in the present case.

REFERENCES


DIAGNOSTIC QUANDARY ANSWER:

Differential Diagnosis : Pyogenic Granuloma, Peripheral Giant Cell Granuloma, Fibrous Epulis,

Final Diagnosis  : Pyogenic granuloma on histopathologic confirmation.